

THE LARVAE OF TWO NORTH AMERICAN DIVING BEETLES OF  
THE GENUS *ACILIUS* (COLEOPTERA: DYTISCIDAE)

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*Abstract.*—The larvae of two dytiscid beetles *Acilius abbreviatus* and *Acilius fraternus dismalius* are described and illustrated. Their life histories are briefly discussed.

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North American, *Acilius* adults were last reviewed by Hilsenhoff (1975) for north-eastern North America and Larson (1975) for northwestern North America. The status of the larval associations was reviewed by Wolfe (1980). Until now only one subspecies, *Acilius fraternus fraternus* (Harris), was positively associated with the adult stage. Associations of *Acilius semisulcatus* Aubé are in doubt because of possible misidentifications of the adult stage and inconsistencies in the larval description (Wolfe, 1980). We have reared the larva of an additional subspecies, *Acilius fraternus dismalius* Matta and Michael and of one species, *Acilius abbreviatus* Aubé. They are described in this paper.

METHODS

A method for rearing small dytiscid larvae was presented by Matta and Peterson (1985). This method has worked equally well with larger larvae and was used in rearing the larvae described here.

Measurements were made with an ocular micrometer in a Wild M8 microscope at 10× (body length to the nearest 0.1 mm) or 50× (other measurements to the nearest 0.02 mm). When ratios are given for segmented appendages, the basal segment is given first and the value given in the ratio is the length in millimeters.

*Acilius abbreviatus* Aubé

Third instar larva.—Length 28 mm. *Color:* Yellow-brown dorsally, pale ventrally, with dark patches at lateral and posterior margins of dorsal sclerites of meso- and metathorax and abdominal sclerites 1 through 6. Coxae with dark markings basally. Head with a dark stripe on the lateral margin and with brown markings on midline (Fig. 1a).

*Head:* Elongate, sides slightly tapering posteriorly, about 1.4 times as broad anteriorly as at cervical constriction. Labroclypeus slightly convex, with distinct thickening apically; apical margin with multiple rows of laminate setae. Ecdysial line branching at middle of head. Lateral margin with 12–14 spines on a carina extending from cervical constriction to ocellar region. Six ocelli present in a circle laterally on the anterior third of head: 2 posterolateral, 1 ventrolateral, 1 anterolateral, and 2 larger dorsolateral ocelli. Antennae 4-segmented, appearing 6-segmented, 2nd and 3rd segments annulate basally; ratio 0.21:0.28:0.36:0.08. Mandible falciform, grooved on inner margin, with minute teeth on inner ventral margin and with a toothlike tuft of hairs on inner margin near base. Maxilla (Fig. 1b, c) with a longitudinal row of setae dorsally, no setae ventrally, 5–6 fine setae on dorsoapical edge; galea spinelike; maxillary palpus

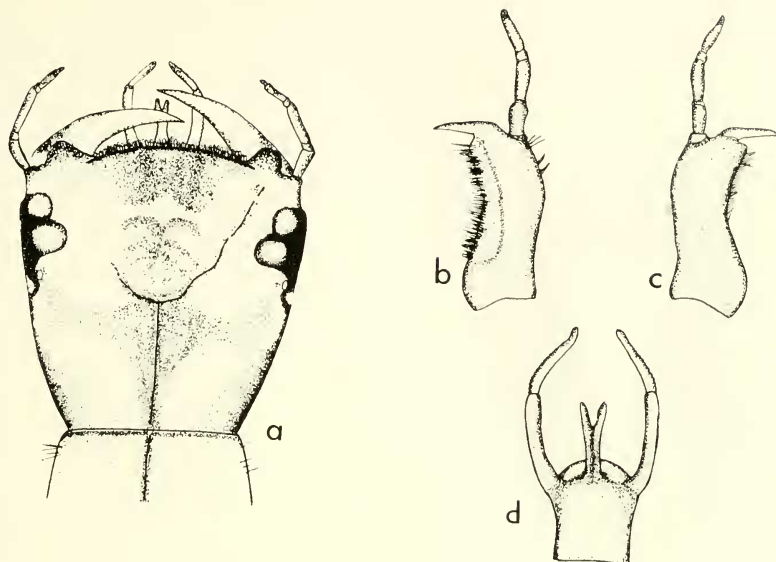


Fig. 1. *Acilius abbreviatus* third instar larva. a. Head. b. Dorsal surface of maxilla. c. Ventral surface of maxilla. d. Ventral surface of labium.

3-segmented, appearing 4-segmented with the 3rd segment annulate near base; ratio 0.17:0.20:0.25. Labium (Fig. 1d), excluding ligula, about as long as wide; ligula slightly shorter than labium (0.30:0.50 mm), apically bifid for one third its length; labial palpus 2-segmented, ratio 0.50:0.37.

**Thorax:** Pronotum elongate, about twice as long as other thoracic segments, which are subequal in length. Spiracles present on meso- and metathorax. Legs with segment ratios as follows: foreleg, 1.42:0.63:1.56:1.06:0.48; midleg, 1.82:0.46:1.88:1.32:0.74; hindleg, 1.86:0.42:1.87:1.34:0.61. Femora, tibiae, and tarsi fringed with a line of fine swimming hairs on anterior and posterior margins and with small setae scattered over dorsal surface.

**Abdomen:** Segments 7-8 completely sclerotized, ring-like; ratio 2.5:3.0 mm; cerci short and thin, ratio to eighth abdominal

segment 0.88:3.0 mm. Spiracles located laterally on segments 1 through 7. All segments with a lateral fringe of hairs, these fine and sparse on segments 3 to 6, long and dense on segments 7 and 8.

**Material examined.**—Described from two specimens, one reared, collected from a spring-fed pool near the margin of Swann Lake, Glacier Co., Montana, July 13, 1983. The pool was about one meter deep, contained a large amount of rooted aquatic vegetation, especially along its margins, and appeared fish free. The larvae were collected near the water surface in open water near the aquatic vegetation.

***Acilius fraternus dismalus*  
Matta and Michael**

Third instar larva.—Length 24 mm. **Color:** Brown to black dorsally, pale ventrally, darker at lateral and posterior margins of

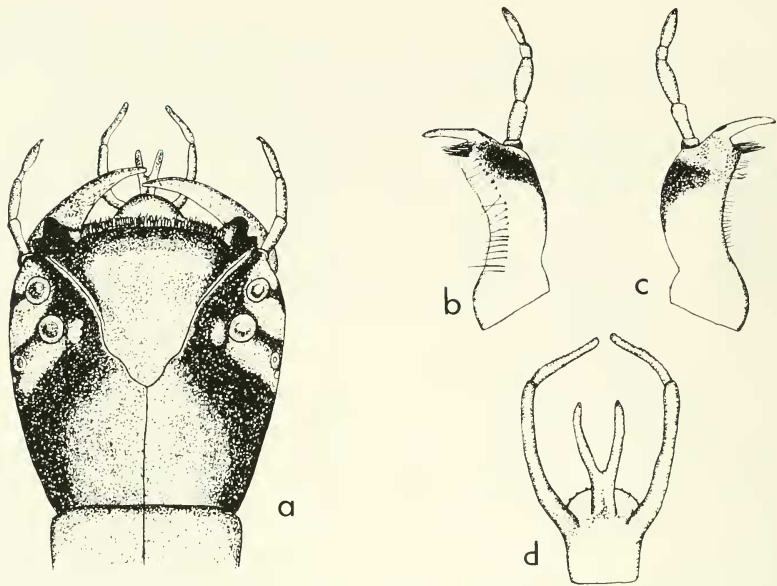


Fig. 2. *Acilius fraternus dismalius* third instar larva. a, Head. b, Dorsal surface of maxilla. c, Ventral surface of maxilla. d, Ventral surface of labium.

dorsal sclerites of meso- and metathorax and abdominal sclerites 1 through 6. Legs yellow-brown to dark brown. Coxae with black markings basally. Head with a dark stripe on the lateral margin and with dark markings on midline (Fig. 2a).

**Head:** Elongate, sides slightly tapering posteriorly, about 1.6 times as broad anteriorly as at cervical constriction. Labroclypeus slightly convex with distinct thickening apically; apical margin with multiple rows of laminate setae. Ecdysal line branching at middle of head. Lateral margin with 14 spines on a carina extending from a cervical constriction to ocellar region. Six ocelli present in a circle laterally on the anterior third of head: 2 posterolateral, 1 ventrolateral, 1 anterolateral, and 2 larger dorsolateral ocelli. Antennae 4-segmented, appearing 6-segmented, 2nd and 3rd segments annulate basally; ratio 0.28:0.33:0.33:0.06.

Mandible falciform, grooved on inner margin, with minute teeth on inner ventral margin and with a toothlike tuft of hairs on inner margin near base. Maxilla (Fig. 2b, c) with a longitudinal row of setae dorsally, no setae ventrally, no setae on dorsoapical edge; galea spinelike; maxillary palpus 3-segmented, appearing 4-segmented with the 3rd segment annulate near base; ratio 0.16:0.22:0.26. Labium (Fig. 2d), excluding ligula, about as long as wide, ligula slightly shorter than labium (0.30:0.50 mm), apically bifid for three fourths its length; labial palpus 2-segmented, ratio 0.62:0.40.

**Thorax:** Pronotum elongate, about twice as long as other thoracic segments, which are subequal in length. Spiracles present on meso- and metathorax. Legs with segment ratios as follows: foreleg 1.20:0.28:0.90:1.04:0.92; midleg 1.60:0.40:1.45:1.30:0.95; hindleg 1.50:0.43:1.38:1.38:1.05. Femora,

tibiae, and tarsi fringed with a line of fine swimming hairs on anterior and posterior margins; with small setae scattered over dorsal surface.

*Abdomen:* Segments 7–8 completely sclerotized, ring-like; ratio 2.5:3.6 mm; cerci long and tapering, ratio to eighth abdominal segment 1.70:3.6 mm. Spiracles located laterally on segments 1 through 7. All segments with a lateral fringe of hairs, these fine and sparse on segments 3 to 6, long and dense on segments 7 and 8.

*Variation.*—Body color varies from yellow brown to black, which seems to correlate well with the habitat. Lighter specimens are found in open, sunlit, temporary pools while darker specimens are found in deeply shaded pools with a leaf litter bottom.

*Material examined.*—Described from 53 specimens, 4 reared, collected from the Dismal Swamp, Suffolk, Virginia. Collection dates ranged from April 13 to April 29, 1981. Larvae are found at the surface in open water areas of temporary pools (generally fish free) and in flooded woodlands. They are usually associated with debris of some kind, either decaying leaves or, more usually, the dead blades of flooded tufts of grass that are fre-

quently found in the temporary pools. On the southeastern coastal plain these pools usually flood in late fall and winter and are dry by mid summer.

*A. fraternus* may be separated from *A. abbreviatus* by the more deeply bifid ligula, longer cerci, longer labial palpus, and differing leg segment ratios, particularly those for the femora and tarsi. *A. f. fraternus* may be separated from *A. f. dismalus* by the presence of dorsoapical setae on the maxillae in *A. f. fraternus*.

#### LITERATURE CITED

- Hilsenhoff, W. L. 1975. Notes on Nearctic *Acilius* (Dytiscidae) with the description of a new species. *Ann. Entomol. Soc. Am.* 68: 271–274.
- Larson, D. J. 1975. The predaceous water beetles (Coleoptera: Dytiscidae) of Alberta: systematics, natural history and distribution. *Quaest. Entomol.* 11: 245–498.
- Matta, J. F. and Peterson, D. E. 1985. The larvae of six nearctic *Hydroporus* of the subgenus *Neoporus* (Coleoptera: Dytiscidae). *Proc. Acad. Nat. Sci. Phila.* 137: 53–60.
- Wolfe, G. W. 1980. The larva and pupa of *Acilius fraternus fraternus* (Coleoptera: Dytiscidae) from the Great Smoky Mountains, Tennessee. *Coleopt. Bull.* 34: 121–126.